headed race, with small features, whilst those from the round barrow were a tall, short- or round-headed race, with larger and more prominent faces. There was nothing new in this statement that the skulls of the ancient Britons of the later or Bronze age were usually of rounded form ; the chief novelty was the fact deduced by Dr. Thurnam from his explorations in the primeval long barrows, that the skulls from that form of tumulus are of extreme length, such as now prevails only in far distant lands, as for example in India, Africa, and Australia.

Dr. Thurnam's general conclusions as to the skull-forms from the barrows, were concisely expressed by him in the formula—"long barrows, long skulls: round barrows, round skulls." This coincidence between the form of the barrow and the shape of the skulls which it contained, appeared to be so strange to some minds that they hesitated to give full weight to the statistics brought forward in support of it. The unfavourable reception which Dr. Thurnam's conclusions met with in certain quarters, however disagreeable to him at the time, can now only be a subject of congratulation, as it no doubt served as a spur to further investigation, the results of which are most conclusive. In the paper published in the Anthropological Memoirs of 1870, Dr. Thurnam was enabled to discuss the character of as many as sixty-seven skulls from the two classes of long barrows, no fewer than twenty-seven of them being from simple barrows, although the first described skull from that class of tumulus was obtained so recently as 1863. The results of the measurements of these sixty-seven skulls, as contrasted with those derived from seventy skulls from the round barrows, may readily be made evident to those of our readers who are least acquainted with the technicalities of craniology. Skulls are now usually classed according to the form of the brain case, as "long," "short," and "intermediate," the limits of each class being accurately defined. Of these sixty-seven skulls from long barrows, then, it is found that eighty-two per cent. are technically long, and eighteen per cent. intermediate; not one technically short or round. On the other hand, of the seventy round barrow skulls, eighty-three per cent. are short, and seventeen per cent. intermediate ; not one long. Bearing in mind that the archæological evidence has satisfactorily established the superior antiquity of the long as compared with the round barrows, the conclusions here arrived at, based as they are upon a wide induction of instances derived from one district and one class of monuments, are a clear gain to science, and are not for one moment to be compared with such hypotheses as that of a primitive short-headed population, founded by Retzius upon the examination of isolated crania from various parts of Europe.

The question of the relation of the men of the long barrows to the existing people is one of great difficulty. It might seem natural to infer that the skulls recognised by some excellent observers, such as Dr. Beddoe, as Keltic skulls, are the modern representatives of the ancient long heads. They seem to us, however, to differ in many essential particulars, especially in the important element of height. Dr. Thurnam appears to have been impressed with certain historical evidence favourable to the notion of the Iberian origin of the long barrow people, and he has accordingly carefully studied the large series of Basque skulls in the museum of the Anthropological Society of Paris. The results of the comparison between the two classes of skulls do not, however, seem to go far towards supporting the Iberian theory. We are inclined to think that Dr. Thurnam should have turned to the north rather than to the south of Europe for the representatives of the primitive long-headed population of Britain. He readily allows that certain skulls obtained from ancient cemeteries (grave-rows) in northern Germany closely resemble those of the long barrow folk, but he seems to have been deterred from following up the clue by the fact that these grave-row skulls are of the iron period, and probably of post-Roman date. Since the date of Dr. Thurnam's paper, however, skulls of the same long and high form have been found in Rheinhessen, in graves assigned by the eminent archæologist Lindenschmidt to a date 500 years before Christ. Similar skulls have also been discovered in Bohemia with weapons of stone and bronze.

We have devoted so much space to the archæological and craniological portion of Dr. Thurnam's paper, that we are unable to notice in detail the admirable way in which the physical facts observed are reviewed in the light of historical evidence. It must suffice to say that the men of the long barrows are identified with those "described by Cæsar under the name of *Interiores Britanni*, as forming the aboriginal population," whilst those of the round barrows are inferred to be the Belgæ, who, according to Cæsar's account, passed over to Britain from the Continent, in immediately pre-Roman times, for the purpose of plunder and making war.

NOTES

WE are glad to be able to state that energetic steps are now being taken in the matter of the Expedition to view the approaching Eclipse of the Sun. We believe that Mr. Lassell, the President of the Royal Astronomical Society, will call attention to the subject at the meeting of the society to-morrow evening.

MR. LOCKYER, in his third lecture on the Sun, delivered at the Royal Institution on Saturday last, showed an interesting experiment with a candle, which gives a good general idea of the solar phenomena as observed by his new method. As round the sun Mr. Lockyer can spectroscopically detect an ordinarily invisible hydrogen envelope which is rendered evident by bright lines only as contrasted with the nearly continuous spectrum given by the white light of the surface of the sun, so also there is an ordinarily unnoticed envelope (of sodium vapour) round a common candle flame which gives a bright line spectrum as contrasted with the continuous spectrum of the flame itself. Mr. Lockyer also showed that some of the phenomena he has seen when watching a solar storm may be reproduced by disturbing a candle flame.

WE have heard so much recently of the long-delayed determination of Cambridge University to apply itself in earnest to the cultivation of Natural Science, that the information contained in the following paragraph must be a blow to those of its friends who hoped to see that it was entering on a new course :—"The Syndicate appointed to consider the means of raising the necessary funds for establishing a Professor and Demonstrator of Experimental Physics, and for providing buildings and apparatus required for that department of science, and other wants of the University, have made a report to the Senate, in which they state that they have addressed a communication to the several colleges of the University, to inquire whether they would be willing, under proper safeguards for the due appropriation of any moneys which might be entrusted to the University, to make contributions from their corporate funds for the above-mentioned objects. The answers of the several colleges, except that of King's, which has not yet been received, have been fully considered by the Syndicate. They indicated such a want of concurrence in any proposal to raise contributions from the corporate funds of colleges, by any kind of direct taxation, that the Syndicate felt obliged to abandon the notion of obtaining the necessary funds from this source, and accordingly to limit the number of objects which they should recommend the Senate to accomplish. They confined their attention, therefore, to the means of raising sufficient funds only for carrying out the recommendations of the Physical Science Syndicate in their report dated Feb. 27, 1869. These were to provide the stipends of a Professor of Experimental Physics, of a Demonstrator and an attendant, requiring altogether a sum of 660*l.* per annum; also to provide a capital sum of 5,000*l.* for a new building, and 1,300*l.* for apparatus. The Syndicate are of opinion that these sums may be raised from the ordinary sources of revenue of the University, and that a small addition (viz., 2*s.* a head) to the amount of the annual capitation tax will suffice for the purpose. They think, also, that there are circumstances connected with the fixing the amount of the capitation tax by the Grace of May 31, 1866, which in themselves justify some increase, and they mention the increased payments of late required for the town improvements. They think that the buildings may be erected from the existing building funds, and apparatus purchased by money belonging to the chest, and now invested." Was ever a more lame and impotent conclusion? It makes us seriously think whether the time has not come when the State should exercise more control over the enormous revenues of these old colleges, which seem determined to go on in the old track.

AN important zoological discovery has just been made in Australia. Mr. Gerard Krefft, the energetic curator and secretary of the Australian Museum, Sydney, has sent to the Zoological Society of London an account of a new and very singular freshwater fish recently discovered in Queensland, which united the external form of *Lepidosiren* with other characters belonging to the extinct Ganoid fishes of the genus *Dipterus* and its allies, and seems to form a connecting link between the *Dipnoi* and the *Ganoidei*. Mr. Krefft proposes to call this fish *Ceratodus forsteri*, after Mr. William Forster its discoverer. His paper on this subject will be read at the next scientific meeting of the Zoological Society on the 28th inst.

IN calling attention to a paper read before the Society of Arts on Thursday last, an abstract of which will be found in another column, we cannot avoid contrasting with the fact that our Legislature is now for the first time directing its attention to the question whether the State ought to recognise Science, the support which the French Government is at the present moment actually giving to scientific researches of the highest importance. In the Budget for 1870 there is a grant of 60,000 fr. for the meteorological observatory at Montsouris; one of 12,000 fr. for the publication of Delaunay's Lunar Tables (to be the first of five similar annual grants); one of 100,000 fr. (to be followed by one of 300,000 fr. in 1871), for the Ecole pratique des hautes études; one of 500,000 fr. for technical instruction; and one of 60,000 fr. for the observatory at Marseilles; while primary instruction finds its true level in a supplementary grant of 1,112,000 fr. for the necessary expenses during 1869 and 1870. In contrast with this, it is doubtful whether the grant of 4,000*l.* voted by Parliament some years ago for a botanical museum at the Glasnevin Gardens, Dublin, may not actually be withdrawn.

WE hear from Edinburgh that there is much excitement amongst the supporters of the Lady Medical Students, on account of the Professor of Chemistry refusing to accord one of the Hope Scholarships to Miss Edith Pechey, who is studying medicine at the university in that town, and who, by the number of marks gained, is entitled to a junior scholarship. The case is stated thus. Many years ago a Dr. Hope, amidst great opposition, opened a chemistry class for ladies. The movement was then so unpopular that he admitted these students through a window, as they were not allowed to pass through the gateway of the college. At his death all the fees he had obtained from this class, amounting to about 1,000*l.*, he left to found the Hope Scholarships. These scholarships consist of four, two senior and two junior. The rule is as follows:—"The class honours are determined by means of written examinations held during the session. The four students who have received the highest marks are entitled to have the Hope Scholarships to the laboratory of the University." This passage from the university calendar certainly gives us the idea that *any* student who has passed the written examinations is entitled, if a sufficient number of marks be obtained, to the benefit of it. Dr. Crum-Brown proposes to give Miss Pechey one of the bronze medals, but declines to give her the junior Hope Scholarship she has obtained, and which entitles her to six months' free admittance to the laboratory. Out of 234 men and six women, Miss Pechey comes third: the two men above her were last year's students, so that of this year's students Miss Pechey stands pre-eminently first. As she is a matriculated, registered, medical student, her supporters contend that she can legally claim the honours due to her. We believe, however, that the matter is to be put before counsel, so that a legal opinion may be obtained on the subject. We are informed, also, that Miss Sophia Jex-Blake's name has come out in the first-class honours list in chemistry; so the lady doctors may fairly be congratulated on the results of their first session in Edinburgh.

THE Senate of the University of London has appointed to the new office of Assistant-Registrar Professor T. A. Hirst, Ph.D., F.R.S., Professor of Mathematics in University College, London, and one of the permanent secretaries to the British Association.

THE new building of the University of London, in Burlington Gardens, will be opened by the Queen in person on Wednesday, May 11. Her Majesty, accompanied by the Prince and Princess of Wales and the Princess Louise, will be received at the entrance of the building by the Chancellor (Lord Granville), the Vice-Chancellor (Mr. Grote), the member for the university (the Chancellor of the Exchequer), and the Chairman of Convocation (Dr. Storrar), and be conducted to the Senate Room, from whence Her Majesty will pass to the larger rooms in the building, and finally to the large theatre, where an address will be presented. The Queen will then declare the building opened, and leave by the principal entrance. As many visitors as can conveniently be accommodated in different portions of the building will be invited, including the Premier, some of the Secretaries of State, the Lord President of the Council, representatives from the sister universities, the learned bodies and affiliated colleges, with the examining staff of the university.

THE chair of Natural History in the Royal Agricultural College, Cirencester, lately vacant by Prof. Thistleton-Dyer's removal to Dublin, has been filled by the appointment of Dr. W. R. M'Nab, of Edinburgh.

THE University of St. Andrews has conferred the honorary degree of LL.D. on Mr. J. T. Boswell-Syme, well known as the editor of the last edition of "Sowerby's English Botany," and the author of many valuable contributions to botanical science.

THE origin of the minute discs termed red blood-corpuscles, which float in our circulating fluid in such countless millions, communicating to it its rich opaque hue, is still a matter of question amongst physiologists, though most are inclined to believe that they proceed from the nuclei of the white corpuscles. But even supposing this to be the case, the question immediately arises, whence come the white corpuscles? and the reply is, from the lymphatic glands, and those large organs which for want of a better term are called ductless glands, of which the spleen, the thymus, and thyroid glands are examples; this reply being grounded on the fact that large numbers of white corpuscles are found distributed in the interior of the glands, whilst the blood returning from them contains more such corpuscles than the blood running towards them. Still the mode of origin of the white corpuscles in these glands and elsewhere is unknown. A recent investigation by Dr. Klein, of Vienna, appears to furnish some clue to the discovery of this point, for he has demonstrated that a process of division of white corpuscles may, under favourable conditions, be observed to occur, a statement which, if corroborated by further researches, will prove of much importance both in physiology and pathology. In the blood of the water-newt, he remarks, three kinds of colourless cells may be distinguished, though their differences are not very strongly marked. In one of these forms the clump of protoplasm, of which the corpuscle is formed, assumes an hour-glass form, and with the performance of the liveliest movements in each half, ultimately divides into two, in each of which a nuclear structure is visible. In a second kind the protoplasm forms a flat transparent disc, from the border of which a projection containing a distinct nucleus forms and gradually becomes detached. In a third form a kind of pinching off occurs of a minute portion from the general mass. The primary corpuscles may divide twice or thrice.

Les Mondes for March 31st contains a translation of Prof. Tyndall's article in NATURE for the 17th of the same month, on Floating Matters and Beams of Light.

MESSRS. W. & A. K. JOHNSTON are preparing a series of Botanical Diagrams for Schools and Colleges, uniform with their "Illustrations of Natural Philosophy," 50 in. by 42 in. A good series of diagrams is very much wanted by botanical lecturers; the parts should be on a larger scale than in the late Prof. Henslow's diagrams published under the authority of the Government School of Science and Art, and the series more complete than that issued by the Christian Knowledge Society, which is very good as far as it goes, and remarkably cheap.

THE Marlborough College Natural History Society has published its report for the half-year ending Christmas 1869, from which we gather, that beyond all question a real taste for science is taking firm root at Marlborough, though here and there, in the various papers, we get all too glowing descriptions, instead of the sober evidence of the keen eye of the observer. Here, for instance, is a description of the cuttle fish:—"And while I enumerate the greatest oddities to be seen in the 'motley crew' of fishes, shall I forget thee, O cuttle, that lookest so innocent and harmless, till some white-waistcoated visitor takes thee up condescendingly, when with one mighty effort thou contractest thy muscles, and in an instant sendest a mighty stream of thy own peculiar ink over that erst virgin waistcoat? Oh, the inimitable look of pity and contempt then depicted on the faces of the natives! If by thy squirts and fliks, O cuttle, thou hast made an enemy, thou hast made one that will never molest thy inky tribe again. It is interesting to know that these murky creatures are provided with backbones which have the peculiar quality of ink-erasing."

THERE is in the West Riding a Geological and Polytechnic Society, which publishes an annual report of proceedings. In that for 1869 an account is given of the meeting held at Wakefield, together with a number of papers on the history, antiquities, and mineral products of the county. The author of "On the Rocks of the neighbourhood of Pontefract," shows that there is coal enough along the line of the Lancashire and Yorkshire Railway, to yield nearly ten million tons a year for 489 years: and that the prospect of getting further supplies below the Magnesian Limestone and the New Red Sandstone is very promising. The Rev. Scott F. Surtees contributes an argumentative paper to prove that the memorable battle between Harold of England and Harold of Norway was fought, not at Stamford Brig, but at Pontefract, and that the memory thereof is preserved by the name Ponte-fract—broken bridge. Other papers contain notices of the extinct fauna of Yorkshire, of flint implements, and of certain singular ancient pits in the neighbourhood of Ripon.

A PARAGRAPH appears in a recent number of the San Francisco *Bulletin*, stating that deer, antelope, bear, and elk constitute the large game of California. Deer are found in great abundance, and many hundreds are killed yearly on Tamalipas. The deep gulches, woods, and covers of Marin County afford excellent sport to the deer hunter. Elk do not range nearer than the Oregon line, but a few are still met with on the banks of the Sacramento and San Joaquin rivers, where in former years they were so abundant. The brown and black bear are also hunted in Marin County, and along various parts of the coast range. White and grey geese are found in all the bay counties, on the lakes, and up the rivers in abundance. Duck are shot in the same localities, of which the most valued is the mallard, which remains and breeds in the country. Then come the redhead, springtail pigeon, wood duck, blue and green winged teal, broadbill, spoonbill, sawbill, whistler, butterball, fantail, or Dutchman, and Cadwell's. Quail abound in the surrounding counties. In the immediate neighbourhood of the city quail are scarce, being trapped and slaughtered for the markets so earnestly, that here they are now almost exterminated. Rabbits are also found in the quail grounds. The English or jack snipe are shot in the freshwater marshes on the San Joaquin and Sacramento rivers, in the Amador, Gilroy, and Santa Clara valleys. Of the bay snipe there is an abundant variety, such as curlew, willet, whitewings, plover, yellowlegs, robin, doewitch, ringneck, and sandpiper. The grouse, one of the finest game birds, frequents Mendocino and the upper counties of the State; several attempts have been made to stock the lower counties with these birds, but with little success. Trout abound in all the rivers running into the bay, and are taken with both bait and fly, but principally the former.

REMARKABLE SPECTRA OF COMPOUNDS OF ZIRCONIA AND URANIUM

THOUGH the spectra of different salts of bases which show well-marked absorption bands often differ in detail, yet they generally resemble one another so much that there is no difficulty in recognising each element. Judging from facts hitherto known, it was more probable that spectra of the new type described in my former paper* were due to a new element than that they were merely due to a combination of zirconium with uranium, and that there seemed to be no reason for suspecting a few special compounds of uranium would give spectra with bands unlike all others. Uranic salts, when in a state of moderately fine powder, give a spectrum not only showing absorption-bands, but also those which depend on fluorescence, and are characteristic of light reflected from the powder.† These two kinds of bands can be easily distinguished by means of a plate of deep blue cobalt glass, which proves that the abnormal bands seen in the spectra of the compounds of zirconia with the oxides of uranium are due to genuine absorption and not to fluorescence.

In studying the spectra of crystalline blow-pipe beads, it seemed desirable to examine those made with carbonate of soda, with or without a little borax. Though beads of carbonate of soda crystallise on cooling, so as to be only partially translucent, yet with strong direct sunlight well-marked spectra may be seen. For example, in the oxidising flame uranic oxide is easily dissolved by carbonate of soda alone, and when quickly cooled an orange-coloured bead is obtained, probably containing uranate of soda in a vitreous condition. It gives a single well-marked absorption-band in the green, with so small a quantity of the oxide, that in a bead $\frac{1}{8}$ inch in diameter $\frac{1}{2000}$ grain shows the spectrum to the best advantage, and even $\frac{1}{10000}$ grain can be easily detected. In examining the various products from jargons in order to study the supposed new earth in a state of purity, a small quantity of a dark-coloured substance was obtained, apparently zirconia, containing some oxide which communicated a green tint to a glassy, borax blowpipe-bead, but yet not sufficiently

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* Proceedings of R. S. vol. xvii. p. 511.

† See Stokes's paper, Phil. Trans. 1852, p. 463 and 1853, p. 392.